[COMMITTEE PRINT]

# REAGAN ADMINISTRATION POLICIES FOR NEW ENERGY TECHNOLOGIES

## REPORT

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FOR THE

SUBCOMMITTEE ON
ENERGY DEVELOPMENT AND APPLICATIONS

AND THE

SUBCOMMITTEE ON
ENERGY RESEARCH AND PRODUCTION

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May 5, 1982

LETTER OF TRANSMITTAL

To All Members of the Committee on Science and Technology:

The Subcommittee on Energy Development and Applications and the Subcommittee on Energy Research and Production cosponsored with the Congressional Research Service on October 15, 1981, a seminar entitled, "Reagan Administration Policies for New Energy Technologies". The seminar provides an overview of the scope, direction, and implications of the Administration's energy policies and their impact on Department of Energy (DOE) programs and on several affected industries. The important background information presented at this seminar is relevant to the current Congressional debate regarding DOE's Fiscal Year 1983 budget request.

The seminar gives a useful broad overview of current policy issues associated with three essential energy technologies -- nuclear energy, synthetic fuels, and renewable energy technologies. Because of the limited time available, as well as the complex and diverse nature of these issues, it was not possible to discuss in detail all of the energy policy questions that Congress must consider. For example, in the area of nuclear energy, the Reagan Administration's policies regarding the future of the uranium enrichment enterprise, the export of sensitive enrichment technologies, and nuclear waste storage were not considered in depth. In the synthetic fuels area, time did not permit a discussion of DOE's support for pre-commercialization feasibility studies. However, the thoughtful analyses regarding the impact of the Reagan Administration policies on our energy future and the question and answer period conducted by senior Administration officials are worthy of particular attention.

Publication of the proceedings of the seminar at this time is intended to contribute to the continuing dialogue surrounding the development of a National Energy Policy in the United States.

DON FUQUA
Chairman

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LETTER OF SUBMITTAL

February 8, 1982

Honorable Don Fuqua
Chairman, Subcommittee on Energy Development
and Applications
Committee on Science and Technology
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

I am pleased to submit the attached transcript of a seminar entitled, "Reagan Administration Policies for New Energy Technologies," which was sponsored by the Science Policy Research Division (SPRD) of the Congressional Research Service (CRS), and by your subcommittee as well as the Subcommittee on Energy Research and Production of the Committee on Science and Technology. The seminar, conducted on October 15, 1981, provided an overview of the scope, direction, and implications of Reagan Administration energy policies and their impact on the programs of the Department of Energy and on the affected industries. Administration spokesmen discussed the scope, direction, and implications of these policies. The seminar was jointly chaired by Dr. Paul P. Rothberg, Mr. Migdon Segal, and Dr. Robert Civiak of SPRD.

At your request this transcript has been edited by the participants in the seminar and prepared for publication as a committee print.

Sincerely,

Gilbert Gude
Director

Congressional Research Service
The Library of Congress

Washington, D.C. 20540

# REAGAN ADMINISTRATION POLICIES FOR NEW ENERGY TECHNOLOGIES

Proceedings of a Seminar Sponsored by the

Congressional Research Service

in Cooperation with the

House Committee on Science and Technology

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April 16, 1982

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## PROCEEDINGS SUMMARY

The proceedings of the seminar are divided into five chapters. Chapter I is a summary of Reagan Administration energy policies by a senior official of the Department of Energy. Chapter II presents an analysis of selected advantages and disadvantages of these policies by a CRS specialist. Chapters III-V are discussions by CRS experts of the possible implications of these policies in three specific types of new energy production--synfuels processes, renewable energy systems, and nuclear energy technologies. A summary of the proceedings of each chapter is presented as follows.

### Chapter I. REAGAN ADMINISTRATION ENERGY POLICY VIEWS--J. HUNTER CHILES III, DIRECTOR, OFFICE OF POLICY PLANNING AND ANALYSIS, DEPARTMENT OF ENERGY

The Reagan Administration is implementing a market-oriented approach to energy policy rather than a Government-controlled market approach. Under this policy, Government intervention in the energy marketplace should be minimized wherever possible.

While energy policy is of fundamental importance, economic recovery remains first on the President's list of national priorities. The current Administration maintains that energy resource and technology development cannot succeed without a stable economy. To help replace Federal subsidies for energy production, the Administration is implementing its Program For Economic Recovery based on supply side incentives and reduced Government interference. Deregulation of oil prices, reduced corporate taxes, and expedited permitting for new facilities will all help improve industry's ability to take the initiative in developing new energy sources in direct response to market realities.

Under the National Energy Policy Plan (III), DOE's research and development activities will focus on advancing the technology base with which industry can bring economically competitive and environmentally acceptable new energy technologies and resources into the marketplace. Government involvement should occur only where industry is unwilling or unable to finance promising new energy technology on its own.

Chapter II. AN ANALYSIS OF REAGAN ADMINISTRATION ENERGY POLICIES--
DR. PAUL ROTHBERG, SPECIALIST, CONGRESSIONAL RESEARCH SERVICE

The Reagan Administration energy policy depends on the private sector to assume much of the cost and decisionmaking involved in innovating new energy technology. Considering our near-term energy supply situation this may be an ideal time to reduce Federal involvement in energy matters. Increased reliance on the marketplace may be a more flexible and efficient means of planning our Nation's energy future than relying on Federal dictates. However, despite a currently promising supply situation, there is no guarantee of continuing plentiful energy supplies. Much of our liquid energy supply still remains subject to powerful and unpredictable forces outside the free market.

Over the past decade, Government funding was designed to complement private investment to ensure adequate levels of innovation for a secure and diverse energy future. Without Government support, there is no assurance that the private sector would be willing or able to finance an appropriate level of research, development, and commercialization of new energy technologies on its own, especially given the cost of financing projects that may not become profitable for more than a decade, if at all. Reductions in Federal funding

could delay the potential supply contributions of many new energy technologies and could result in the loss of valuable time and experience in moving these technologies forward. Without contributions from these new sources, the possible energy supply crunches of the late 1980s or 1990s could be far worse than any we have yet experienced. However, some of these technologies may not be successful in the marketplace, even with vigorous Federal support. In addition, the Reagan Administration would argue that the incentives offered under their proposed policies will stimulate increased domestic production and will help our long-term energy situation.

Chapter III. IMPACTS OF REAGAN ADMINISTRATION ENERGY POLICIES ON SYNFUELS--DR. PAUL ROTHBERG, SPECIALIST, CONGRESSIONAL RESEARCH SERVICE

The Reagan Administration has reshaped national synfuels policy so as to rely more on private investment and less on Federal tax dollars. The Administration's policies to end oil price controls, to accelerate depreciation schedules, and to inventory the availability of resources needed for synfuels production could provide a business environment that will promote more investment in synfuels projects than is forthcoming today. However, it appears that much of the private sector is still waiting for the incentives that may be forthcoming from the United States Synthetic Fuels Corporation (SFC) before investing the substantial sums necessary for a commercial plant.

Under the Reagan Administration, the Federal Government has barely begun to initiate the large-scale synfuels production programs created by the 96th Congress. The fast track program envisioned under the Amendments to the Defense Production Act, P.L. 96-294, has resulted in only two awards to encourage synfuels commercialization. DOE's loan guarantee authority under the Federal Nonnuclear Energy R&D Act has fared little better as it has only been used

to aid one large-scale synfuels project. Instead of financing massively expensive synfuels demonstration projects or aiding commercialization efforts, DOE will now focus on the funding of long-term, high-risk R&D projects that industry would not be in a position to finance. Considering these and other factors, the chances of meeting the National Synfuels Production Goals envisioned in P.L. 96-294 have diminished substantially. However, thus far, the SFC is proceeding with its program and the Reagan Administration has not yet sought any changes in either its funding or scope of activity.

Chapter IV. IMPACTS OF REAGAN ADMINISTRATION ENERGY POLICIES ON RENEWABLE ENERGY TECHNOLOGIES--MIGDON SEGAL, ANALYST, CONGRESSIONAL RESEARCH SERVICE

The Reagan Administration has proposed sharp cuts in the renewable fuels program envisioned by the Carter Administration. Spending for such technologies as solar energy and alcohol fuels is to be severely reduced, with some programs, such as the solar bank and the alcohol fuels loan guarantee program, to be cancelled outright. The underlying philosophy behind these cuts is that the Federal role in energy development should be to aid in long-range research and development, while leaving short-term development, and commercialization, to the private sector.

Thus far, the Congress seems willing to accept the concept of budgetary reductions, but not the severity of these reductions as proposed. Congress has therefore taken actions to "push back the cutbacks," and to preserve some programs marked by the Administration for elimination, such as the solar bank and the alcohol fuels loan program.

The outlook for the future of these renewable energy technologies is clouded, with disagreement among the experts. The optimists believe that, with the decontrol of competing fuel prices, and with the continuation of

the existing Federal tax credits, these industries should be able to survive without direct Federal support. The pessimists believe that these programs will be crippled by what they see as a premature withdrawal of Federal support necessary for these "infant industries."

Chapter V. IMPACTS OF REAGAN ADMINISTRATION ENERGY POLICIES ON NUCLEAR ENERGY--DR. ROBERT CIVIAK, ANALYST, CONGRESSIONAL RESEARCH SERVICE

The Reagan Administration may have difficulty revitalizing the nuclear industry. It could take several years to restore industry confidence in nuclear power, partly because utilities are aware that Government nuclear policy could shift again before new plants could be built. Investment tax credits may not help utilities build nuclear plants, because electricity rates are set by State Public Utility Commissions, which take taxes into consideration in setting those rates. The Administration's efforts to speed up licensing of new nuclear plants could result in substantial savings for plants scheduled to begin operation in the next 2 years.

Despite Administration support for the Clinch River Breeder Reactor, substantial congressional opposition to the project remains. There may be more close votes in Congress on whether to cancel Clinch River, and the project may be delayed by licensing requirements unless Congress acts to bypass the normal licensing process.

The Administration and the nuclear industry still appear to be far apart regarding the possibilities for completion of the Barnwell reprocessing plant by private interests. A scheme to complete the plant may yet be worked out, however.

## I. REAGAN ADMINISTRATION ENERGY POLICY VIEWS

DR. ROTHBERG: I would like to welcome everyone to our seminar entitled "Reagan Administration Policies for New Energy Technologies." We are most pleased that the Subcommittee on Energy Research and Production and the Subcommittee on Energy Development and Applications of the House Committee on Science and Technology are cosponsoring this seminar. The purpose of this morning's program is to present congressional staff with an understanding and appreciation for the new National Energy Policy that is evolving out of the Reagan White House.

These energy policies mark a dramatic departure from the policies of the past three Administrations. During the discussions this morning, we will provide some insights into the scope, direction, and implications of these policies as well as their impact on the programs of the Department of Energy (DOE) and on the affected industries.

Our discussions will focus on policies concerning energy research, development, demonstration, and commercialization activities. We are most pleased that Mr. J. Hunter Chiles, Director of the Office of Policy Planning and Analysis of DOE could be our first speaker this morning.

Mr. Chiles will provide us with a broad overview of the Reagan Administration's energy policies and will discuss their implications for the Department. Following Mr. Chiles, I will summarize some of the possible advantages and disadvantages of the Reagan Administration's energy policies as they apply to the innovation of new energy technologies. We will have a question and answer period directly thereafter and invite members of the audience to present their own views as well as their own questions and comments on the new directions in energy policy.

The second part of our program will consist of three presentations by members of the CRS staff. We will discuss the Reagan Administration's energy policies and their implications for the affected industries in three specific areas of energy supply. We will discuss synfuels production, renewable energy, and nuclear energy. After each presentation we will again solicit questions and comments from the audience.

Thank you. Mr. Chiles--

MR. CHILES: Good morning. This Administration's philosophy is based on an evolving market-oriented approach to energy rather than a Government-controlled market. The free market approach is based on the simple concept that a "controlled" environment cannot react to changing conditions, since "controlled" implies that all conditions remain the same or react in specific ways at specific times. Reality is, of course, that national and international events do change and often in unpredictable ways and at unpredictable times.

Therefore, increased reliance on market decisions offers a continuing national referendum, which is a far more flexible means of charting the Nation's path than stubborn reliance on Government dictates or on a combination of subsidies and regulations.

When this country was founded, our Government was set up as a representative system. Because of the size of the country at that time, it was not difficult to have such a truly representative system. That system and our country was built on and by free enterprise. Now, with 220 million people, representation in the Government of the realities of our Nation is far more difficult. But in the marketplace everyone is represented. Therefore, the role of Government is to prevent the obstacles to that effective representation.

The National Energy Policy Plan, unlike the two previous plans, does not represent a game plan with consumption and productivity objectives. It is

a philosophy of unburdening the Nation and shifting to reliance on the free market system.

The President's economic recovery program includes elimination of excessive Federal spending and taxes, regulatory relief, and sound monetary policy. The action taken last January to end oil price controls and to dismantle the burdensome regulatory apparatus associated with those controls was a major step in implementing an energy policy focused on market realities.

Economic recovery ranks second to none on the President's list of national priorities. While energy remains of fundamental importance, until we achieve stability within our economy, we are not going to succeed in developing our energy resources or in promoting new technologies or anything else.

Instead of treating energy as an isolated entity, our management and energy policy philosophy has been fashioned within the context of the overall economy. The President's Program for Economic Recovery is as much a factor in energy policy as the specific actions of the Department of Energy.

What is the impact of these policies on DOE? First, the lifting of unnecessary administrative regulation will eliminate certain regulatory activities by DOE of market activities, thereby reducing the numbers of people and activities engaged in regulatory business.

Second, DOE will discontinue competing with industry in development and commercialization of new technologies which have proven to be currently viable and are either in the marketplace or near commercialization.

Third, components of DOE, in cooperation with other Government entities and industry, will concentrate generally on long-term, new technologies that can plant the seeds for tomorrow's technology.

It is within the context of marketplace initiatives and regulatory reform that we are structuring our R&D program. The Government should continue to

be involved in those promising areas of energy technology where the private sector is unlikely or unable to invest. I want to emphasize unlikely or unable, since drawing a precise boundary line between public and private spending is difficult. It will vary from technology to technology and from resource to resource. And most importantly, it will have to be redrawn continually as market factors change.

Let me mention a few examples of what I'm talking about. Nuclear power is an essential part of our nation's energy mix. It should be allowed to compete fairly in the marketplace. The record of commercial nuclear power in the United States is evidence that this technology is operationally sound. Furthermore, the Administration is committed to carrying out whatever steps are necessary to demonstrate that technically acceptable means exist for the proper disposal of highly radioactive or very long-lived reactor wastes.

The problems facing nuclear power in the country did not begin or end with the Three Mile Island accident. Reactors are capital-intensive technology. Inflation and regulatory delays have gnawed away at the attractiveness of nuclear power plants and have in fact effectively imposed a moratorium on new orders. Reducing inflation is a step toward solving some of these problems. And the Administration is working with the Nuclear Regulatory Commission on specific means of improving the plant licensing process.

Renewable energy sources, such as solar, wind, and biomass, should play an increasingly significant role in the future, especially in specific regional markets where they make economic sense. However, they are not capital-intensive technologies and are small-scale. Unlike the previous Administration, we are not setting targets for their respective energy contributions. We firmly believe that realistic energy prices are the best overall incentive for these technologies.

What about synthetic fuels? First let me emphasize that this Administration is fully committed to the development of a durable, commercial synfuels industry. But here again we want private enterprise to choose among the numerous technologies, both liquid and gas producing, and to show the conviction of their choices through investment of private funds.

We believe the emergence of a synfuels capability in this country will send OPEC the clear message that we are serious about alternate sources of hydrocarbons. This alone may restrain world oil prices sufficiently to offset the needed investments to get the industry off the ground.

This summer Secretary Edwards took the necessary first steps. His approval of loan guarantees for the Great Plains Coal Gasification Project and the Tosco portion of the Colony Oil Shale Project, along with the purchase commitment for the Union Oil Shale Project, will be viewed, in my opinion, as some of the most significant actions this country has taken to insure its energy security.

All three of these projects are consistent with the Administration's energy policy--namely, that the pace of development be determined by firms willing to risk substantial sums of their own money. Each of these projects places the Government out of the role of providing direct front-end funding. And only if world oil prices fall or fail to keep pace with projected increases or an unforeseen problem develops related to the first-of-a-kind nature of these plants, will the Government become directly involved.

The three projects are unique in that they are ready today to begin construction. In the case of Great Plains, for example, planning and design have been under way for nearly a decade.

Where the questions are primarily of scale-up in economics, and where invested capital to answer these questions offers near-term potential for profit, the initiative should be industry's. Where the payoffs are too far in the future or the risks too great, the Government should take the lead.

We see our role as filling in the gaps in the technical data base and taking long-range technologies to the proof of concept stage. Even then, we must recognize that there are more worthwhile projects that can be funded, and for all its recognized worth, R&D will have to compete among other national priorities.

I would now like to discuss the specific direction DOE programs will take with regard to R&D and energy technologies. R&D activities will focus on establishing the technology base with which industry can bring economically competitive and environmentally acceptable new energy resources and technologies into the marketplace. This includes activities critical to improving our understanding of the fundamental scientific and engineering mechanisms and to predict performance associated with energy resources and technologies.

In addition to energy-related R&D, DOE will continue to support programs of fundamental research in the physical and life sciences that maintain the competitive position of the United States in the search for new knowledge, the availability of leading scientists and the most advanced concepts for addressing energy objectives.

We will focus Federal programs on elements that attract limited or private venture capital. Private sector participation will be sought in individual projects, both to increase the impact of the Government's expenditures and to focus Government efforts toward activities which the private sector will ultimately support totally.

We must emphasize technologies which contribute to conservation--that is, major generic improvements in the efficiency of energy use, which is an area in which the Government has been a poor performer in the past; supply technologies which contribute to our transition from dependence on relatively scarce, conventional oil resources to more abundant fossil resources such as coal, and oil shale in the mid-term; and, in the longer term, substitution of renewable sources for finite sources where economic. In those long-term, potentially high-payoff

areas that will not attract private venture capital, efforts will be aimed at bringing the level of development by DOE to the point where sufficient data is available for the private sector to conduct their normal technical, economic, and environmental risk assessments and to allow private investors to determine the time of introduction into the supply mix.

In support of the President's economic recovery program major emphasis is being placed on production. A strong economy will require a net growth in energy use which must be achieved through increased production as well as improvements in energy efficiency.

We see our role as follows: In coal--to develop technology for increased direct use of coal in an efficient and environmentally acceptable manner; to establish a sound technology base for conversion of coal to gas and liquids; and to develop advanced technology for additional processing of coal liquids.

In oil--to develop advanced technology for extraction of unconventional petroleum resources in an environmentally acceptable manner.

In gas--to establish a technology base for unconventional gas exploration and development.

In nuclear--to complete our obligation to put a high-level waste repository into operation; to demonstrate the breeder reactor; to evaluate advanced reactor types; to accelerate high-level waste solidifiction and deposition programs; to upgrade safety and management facilities based on TMI lessons and DOE internal reviews; and to foster successful commercial operation of reprocessing.

In magnetic fusion--to demonstrate plasma confinement conditions sufficient to lead to a practical fusion system; to initiate a comprehensive program of engineering research and development, including possible construction of a large-scale engineering device; to continue research in the engineering

aspects of fusion machines, especially in the difficult area of materials research; and to conduct periodic, comprehensive assessments of the status and potential for fusion.

In solar and renewables--to increase efficiency and reduce costs of photovoltaic cells; to conduct long-term R&D for a variety of renewable electricity generating and related storage technologies; and to conduct basic R&D for materials and products for passive solar applications.

This, in brief, is how we see a National Energy Policy. It is a policy that contains a near-term component--regulatory and pricing reform--while continuing to insure that the longer range, higher payoff technologies are moved into position to contribute in the future. Personally I'm convinced that the policy will work. And it is the free choices and collective judgments of resourceful and inventive people that are going to make it work--at the proper pace and with the proper balance of priorities.

This policy does not address every subject of interest to every industry or private interest group; but it does establish a framework for what I believe is a rational and logical program consistent with the Administration's policies and with the funds available. That's what I believe. What matters more is what the American people believe.

We need to know if there are technology areas where we need to be involved. And just as importantly, we need to know where we have crossed over that boundary separating Federal involvement from Federal intrusion. Only with such input can our program become an integral component of the solution side of the economic equation. Thank you very much.

## II. AN ANALYSIS OF REAGAN ADMINISTRATION ENERGY POLICIES

DR. ROTHBERG: Thank you, Mr. Chiles, for your stimulating presentation on the Reagan Administration's philosophy and directions in energy policy. I would like to start the discussion period by offering some comments on the possible advantages and disadvantages of the new energy policies you just outlined. I hope my comments will prompt some thoughtful questions for you from the audience.

As you mentioned, the Administration wants to reduce Federal involvement in energy matters and to rely increasingly on the workings of the marketplace. Considering our near-term energy supply situation, this indeed may be an advantageous time for Federal involvement in energy research, development, and commercialization to be reduced. Compared to the last 5 years, our current energy supply/demand situation appears relatively good. Oil imports have dropped significantly from their peak in the late 1970s. In August domestic production was up for the third consecutive month over last year's levels. Conservation of fuels prompted by the marketplace and Federal incentives has been greater than expected. In addition, oil prices in the international market have temporarily declined from their previous highs.

The third edition of the National Energy Policy Plan also is generally consistent with the Administration's Program for Economic Recovery, as you pointed out. Reductions in DOE's budget and the possible dismantling of the Department should contribute toward the goal of one day balancing the Federal budget.

As you suggested, increased reliance on the marketplace may indeed be a far more flexible means of planning the Nation's energy future than relying on the

Federal Government's dictates or on a combination of Federal subsidies and regulations. The private sector may prove much more efficient in deciding how to spend money on energy technologies than has the combined decisionmaking of the executive and congressional branches of Government.

On the other hand, many energy forecasters suggest that the current oil glut will prove temporary. These forecasters also stress that we will face long-term trends of increasing prices and decreasing supplies of oil. We must not forget that much of our energy future, especially the liquid portion of that future, is controlled by powerful and unpredictable forces outside the free marketplace. Our energy future is closely tied to the future of our national security.

Therefore, it seems reasonable that any energy policy should not depend on a promising energy supply scenario, but could consider many national factors besides economic considerations and the ability of the free marketplace to respond to energy needs. For example, any national plan could consider its long-term implications on domestic energy supply and the close interrelationships between energy supply and national security.

This now brings us to the key question of whether the current energy plan will accomplish its objectives and provide the necessary energy supplies to meet our long-term needs.

Let me look at this problem historically for a moment. Primarily since the oil embargo of 1973-74, the Federal Government has increasingly sought to complement private investment in the innovation of new energy technologies. By using the term "innovation," I mean the entire process of research, development, and demonstration of new technology, as well as the final stage where this technology is commercialized and brought into the marketplace.

A major justification for public investment in energy technologies was to insure that an appropriate level of funding was allocated to achieve a variety

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of national goals. A strong national energy program was intended to help the Nation develop long-term energy supplies sooner than the marketplace would have provided these supplies.

If Federal support of the innovation of new technologies continues to decline as the current Administration plan suggests, then serious concern may need to be given to the level and extent of privately-funded efforts. The private sector may not risk the necessary level or type of funding to insure sufficient and diverse means of obtaining our long-term energy needs.

Facing high debt/equity ratios, enormously high interest rates, and the current oil glut, many companies are justifiably wary of risking their scarce capital in energy projects that might not prove profitable until the 1990s, if at all. In fact, many companies state they will not pick up many of the current Federal energy R&D projects that do not yet appear to be easily commercialized.

As the situation stands today, without a variety of different forms of Federal support for demonstration and commercialization activities, future production capability from many new energy technologies may be inconsequential before the early 1990s. With few exceptions, high-Btu coal gas plants, shale plants, tar sands plants, OTEC plants, solar-thermal powered utility plants, MHD plants, combined cycle gasifiers--just to name a few technologies--are unlikely to be commercialized in the United States before 1992 without Federal support. In contrast, the Administration suggests that, in general, alternative technologies will come into the marketplace at the appropriate time and the timing of the decision is best left to the private sector.

On the other hand, some of these technologies may not be successful in the marketplace, even with vigorous Federal support. The commercialization of a technology is an extremely difficult process and typically encounters many problems. The simple infusion of Federal dollars into this process does not guarantee that a technology will compete successfully or will be environmentally

or socially acceptable. In fact, many of the projects that DOE supported in the past have not yet resulted in the successful commercialization of new technologies. Furthermore, the contribution from new energy technologies over the next 10 years may constitute only a minor percentage of total U.S. energy needs, even if Federal/private efforts at commercialization are successful.

However, if we rely primarily on only the workings of the marketplace, i.e., let private companies choose the timing of any investment decision, we could delay the contributions from these technologies and we could lose valuable time and experience in moving these technologies forward. Without vigorous and sustained Federal support, we may be withdrawing from potentially high payoff programs long before the appropriate point when it is practicable for industry to bear the risk. We could also be abandoning the world market of these technologies to other countries that vigorously pursue these energy supply options.

Without contributions from these sources, the possible energy supply crunches of the late 1980s or 1990s could be far worse than any that we have yet experienced. Increased domestic production capabilities, coupled with rigorous energy conservation measures, might not be sufficient to cope with a long-term oil embargo or energy shortage. However, the Reagan Administration would argue that the incentives offered under their proposed policies will stimulate increased domestic production.

On the other hand, I should point out that the Reagan Administration's program does provide a variety of means to help our long-term energy supply situation. Under the plan the size of the Strategic Petroleum Reserve would be increased. Mr. Chiles mentioned that the Administration seeks to reduce regulatory problems that adversely affect energy production. For example, he talked about the possible easing of restrictions on the commercialization of

nuclear energy. He mentioned that the plan does not call for the elimination of Federal investment in new energy technologies, but rather it calls for an improved focus of Federal spending in this area. But the question of whether these actions, coupled with the tax advantages and decontrol of oil discussed previously, will prove satisfactory and sufficient over the long term remains.

I have presented these concerns here to underscore the importance of Congressional reaction to proposed Administration policies. Congress has already demonstrated a strong interest in analyzing proposed national energy policies and reshaping them to meet our nation's complex energy needs.

As continued funding reductions are contemplated, the budgetary and energy policy decisions facing Congress will become increasingly difficult.

I would now like to open the floor for questions and comments to Mr. Chiles.

QUESTION: Mr. Chiles, you said that the recent decision of the Administration to provide a loan guarantee for Tosco's portion of the Colony project and to provide a price guarantee for the Union project were consistent with your energy policy. Can you explain why it would not be more consistent not to provide such subsidies?

MR. CHILES: I think what I said and what we believe is, if the private end of the business had not put up so much of the money themselves, we would not have done it all.

You may remember I talked about two things, I said in the early stage we think that private industry ought to take the projects that have near-term commercial viability, have obvious profitability and a return on the investment; and that the Federal Government should take, in kind, the kinds of projects

where the potential is very high, the risk is very high, and the timing is very far off.

Look at what has happened. You've got one side over there and one side over here with a huge gray area in the middle. I think projects like the Tosco oil shale project are in that gray area. Within that gray area, it looks to me like there should be some proportionality between what the Federal Government should do and what the private industry should do. I think in the cases of these three we have reached, without saying so, a kind of understanding of where one of those proportionalities might be. And what it says is, as long as the big oil companies are willing to put up a tremendous share of the capital on these projects, we'll help them get over the brink so that these projects can fly.

And I might say, it's not that much unparallel to what was done during the Carter Administration on helping the conservation projects. If you remember, at that time and back in the 1977 era or so, you had a situation where the price of oil was controlled. When you were trying to have conservation replace a price controlled substance which was unrealistically low, clearly it was necessary to subsidize those other forms of energy or energy conservation or they just simply couldn't compete. If, on the other hand, there had not been price controls at that time, the price of oil would have been higher and they could have probably marginally competed.

So, when you regulate prices, you then have to regulate some sort of supports. We have taken the position that we're going to try to unregulate prices, in which case we're going to look very carefully at whether supports are therefore needed.

as an example, let's take the price of oil. You know, it's now about $34 a barrel. Compared to $15 dollars a barrel, clearly you don't have to have the kind of incentives that you had for conservation when it was $15. This is why we think the free market will work better. In my estimation, most of the regulatory processes, such as the way natural gas works right now, are examples where the government simply did not trust industry and said, rather than let the free market operate, we're going to regulate so that it will operate as if it did operate freely because we don't believe that industry will allow it to do so.

That is a very convoluted answer to your question, but I hope it gives you some flavor for how we're looking philosophically at this whole problem. It's a very complex issue, and I hope that helps somewhat.

QUESTION: Would you please clarify the Administration's position on the accelerated decontrol of natural gas? Also, would you discuss how you answer those who say that accelerated decontrol will raise the price of gas and adversely affect consumers, especially the elderly?

MR. CHILES: I have nightmares of my coming before Mr. Dingell's committee and over on my right shoulder is a 75-year-old lady on Social Security, and she says to him. "If you put through natural gas decontrol, I'm going to starve to death." And he turns to me and says, "Well, Mr. Chiles, would you like to explain to us why you want this woman to starve." This is the kind of issue it is. It's a very emotional issue.

But let me go back to your first question--about the natural gas decontrol. As you may know, my office within the Department of Energy is the one that's doing all the analysis on decontrol. We have been the one that has

given the Secretary what he has taken to the Cabinet Council. The Cabinet Council has reached decisions unanimously, by the way, and taken their recommendations to President Reagan on what they think ought to be done on natural gas decontrol. We are waiting for the President to come up with his announcement of what he's going to do, whether it be do nothing, do everything, do what the Cabinet Council said now or later, or what have you.

My suspicions, and my suspicions I get the same place you do, from reading the newspapers, are that probably--I'd say before Thanksgiving--there will be an announcement made by the President that we want to go ahead with natural gas deregulation. How that will take shape, I can only speculate like you can. I know what the Cabinet Council recommendations were and all of you who read Energy Daily, I'm sure, do also. It looks like some sort of a phased decontrol. But what we're really saying in the Administration is, we don't think that the Administration should have a hard position and say, "This is the way natural gas decontrol is going to take place, give it to the Congress and say take it or leave it."

What we want to do is talk with the leaders of Congress and find out how it is best to go about this, to try to address some of the problems you talked about like what to do about the little old lady that's 75 on Social Security and see if there's some way we can effect this and make it work right.

Now let me just say a little bit about what natural gas decontrol will be. And I don't know how much any of you know about the Natural Gas Policy Act of 1978, but simply stated, in my estimation it won't work. If you leave it alone, you're going to have an absolute disaster in 1985. Reasons are fairly simple. The Act was based on the fact that in 1985 the assumption

was that oil would be $15 a barrel. Clearly that's not correct. Secondly, it was based on a presumption that we would not find more gas if you increased the prices, and clearly that's not correct. We can see what happened when we decontrolled oil. We already heard from Dr. Rothberg what has happened in the history of production in this country. Just to give you one fact that stood out in my mind, between January and April of this year, we drilled 42 percent more wells than we drilled in the same period a year ago after we deregulated the price of oil. So it looks to me, and it looks to all of us, that if you did deregulate the price of natural gas in some manner, you would stimulate production.

The Natural Gas Policy Act of 1978, by the way, does not deregulate all gas by 1985. I don't know if you're all aware of that. After 1985, there is a considerable portion of it--some people think between 40 and 50 percent--that will never be deregulated.

So what we have done is looked at that situation and said what happens if you come to 1985 and you deregulate. What you have is a tremendous increase in prices overnight because of the way the mechanism of the gas industry has worked over time, and because we've had some prices of gas regulated and gas is still available to some people who have it at 28, 29 cents a million Btu. These people were able to get contracts for gas at $9 or $10 a million Btu, roll it in with this cheap gas, and get a price of about $2.50 and they're very happy when they're sitting on these nice $9 and $10 contracts.

Look what happens. If you decontrol natural gas and the 28 cents gas goes away, your price starts to approach these high value contracts and all hell's going to break loose in the gas industry. And I think what would happen

is that in 1985, the same arguments would be made that are being made today by the same people who say you shouldn't deregulate natural gas today.

So what we're trying to do is to find a mechanism to in effect smooth out this jolt. To give you some figures off the top of my head, I believe if you look at the price projections under the Natural Gas Policy Act of 1978 (NGPA), you see the price of natural gas from now through 1985, before this huge flyup will occur, going something like about 10 percent greater than the rate of inflation. And I think a historical look back to 1978 would show you about that same thing.

We see that rate increasing by maybe 5 percent more under the kinds of deregulation proposals that we've been looking at. So the hit is not that bad, but the important thing is that, after 1985, the prices, if you go with this kind of deregulation act, will actually be lower past 1985 than they would be under NGPA. It reminds me of the Fram Oil Filter commercial, you know. "You can pay me now or you can pay me later." What we're trying to do is to smooth out this stream of gas so that you can deregulate natural gas eventually and do it in the most fair manner.

Now a lot of people say why don't you just leave the prices the way they are? Wouldn't deregulation be unfair to the people who now have natural gas? Sure it would be. But it would also be unfair to everybody who is heating their house with oil. I just moved here from Pittsburgh, and thank God I had a house that was heated with natural gas because there were neighbors around me that were trying to sell houses that were heated with oil and their prices were about $10,000 below the comparable house just because they had

oil heat. So it's a double hit. The guy who has natural gas right now is fat and sassy and he's gotten, you might say, a windfall profit from having for the last 28 years subsidized prices for his product, while the guy who's on oil, electricity, what have you, does not have this subsidy. And you must ask yourself also, "Is that fair?"

Again, I'm sorry, a very long answer but an extremely complicated and highly emotional issue.

QUESTION: This is a follow-up on the initial question, focusing on the Administration's policy toward reprocessing. The Administration has indicated that it intends to take all the necessary steps to foster reprocessing. The technology, of course, is well known but one on which the industry has indicated an unwillingness to proceed. Doesn't the decision to provide a guaranteed market for the purchase of the reprocessed materials unfairly skew the marketplace?

MR. CHILES: Now you're saying something I've never heard before. I didn't know there was any kind of a guaranteed market. In fact, I was at a meeting on Tuesday in Florida and somebody asked me the question of why wouldn't the Government guarantee the market. And my response was, "Look, you either believe in the free market totally or you don't." I think many of you may know my background. I've spent 21 years with Westinghouse. I know, for example, that if you reprocess fuel today you're going to get $65, $66 per pound equivalent of fuel out of it and right now you can buy uranium on the open market at $27. You'd have to be nuts to get into reprocessing on the basis of that kind of economics.

However, as the economics change over time, I think maybe you'd want to do it. What the Administration is saying is that we do want reprocessing to start up again. We think, again, that private enterprise should take care of it when the economics are right for them.

Now, I will say this, that if we do have a breeder technology and if at that point you don't have a reprocessing capability in private industry, clearly Government's going to have to take another look at it. But what we see now is to not subsidize that market, as far as I know, unless you know something I don't, and to see if private industry won't get into the business again.

Incidentally, I've also heard rumors that Bechtel Corporation is looking at buying the Barnwell Plant. So, maybe it's going to happen anyway.

DR. ROTHBERG: Before the next question, I wanted to interrupt and introduce Dr. David Swanson, who's working in the White House on broad energy policy matters and also on future plans for the dismantling of the Department of Energy. In addition to Hunter taking questions, Dave is also available to take any questions.

QUESTION: Could you explain how it's consistent with the Administration's philosophy for the Department of Energy to propose a rule that would allow private investor-owned utilities to bypass the financial markets and bill their consumers directly for construction work in progress in these centralized plants? And isn't this in effect a $50 billion subsidy to centralized power generation?

MR. CHILES: If one chooses to take that argument. I guess I look at it a different way. When you look at the history of the electric utility

industry when we set up how we were going to allow utilities to get their rates and so forth, they came up with a concept called the "Used and Useful Rule," which says that utilities can charge their customers for apparatus when it is in place and operating. Now in those days the interest rates were something like one and three-quarters percent and the time of construction was about 3 years. Clearly, that's not the situation any more where you're running 14 years construction cycles and 18, 19 percent interest rates.

We are in a situation now where a utility, or anybody, just simply cannot afford that kind of long-term investment any more. What construction work in progress really gives you is something analogous to what an industrial company does. He charges more money for this product now to help pay for the factory he's building for the products he's going to build in the future. Now, a lot of people will say, well that's nice, I hear you, but why should you let today's customers pay for tomorrow's electricity; they probably won't even be there. When you do the research on that, what you find is something on the order of 65 percent of the customers in the future will be those who are there today paying for this.

And incidentally, one of the other things--I hope this doesn't border on propaganda--was when I was back with Westinghouse, I had a gentleman who did a lot of research and had an article printed in Public Utilities Fortnightly where he looked at the question of construction work in progress and compared the stream of revenue requirements for the utility from the customer if they did have construction work in progress versus what that same customer would pay over time for the electricity if there were not construction in progress. I think he used 25 years. The whole thing went through with the

big lump at the end when the plant was ready to go. Then he paid through the nose for that capital for the next 15 years. He found that the investment was equivalent to his being able to put the same amount of money in a money market fund paying 35 percent interest.

So I don't know whether this will convince you, but it looks to us when we did the mathematics that it's a good economic deal for the customer. He may not like paying the higher prices, of course, and who would--but it looks like it's an economic thing for the customer in the long term. It's obviously a good thing for the utility in the short term and the long term. And it keeps the price of electricity in the long term lower than it otherwise would be.

QUESTION: You don't feel that the higher cost of electricity today would suppress demand in the future?

MR. CHILES: Sure it will. The question is to what degree? What can I tell you? One of the reasons why we have the economic package we have is to get interest rates down. I don't know how many of you know this, but in a 10-year cycle time for either coal or nuclear power plant, 52 percent of the cost of that plant is interest during construction. So clearly, if you get that interest rate down and if you close down on the time it takes to build a plant, you will decrease considerably the cost of the capital portion of the electricity. The capital portion, by the way, is about 40 percent or so in a general utility rate base. In a nuclear power plant, as an example, it's more like 70 percent, so you see once you get the plant built and you have that capital sunk, that becomes a constant cost and your variable costs become very small. So from that standpoint, it's very economical to you as a customer in the long term to try to get this stuff built and in place in a hurry, because once you get it built, you're glad you have it. Building it is very, very painful.

QUESTION: You indicated that the Administration supports the development of photovoltaics by increasing their efficiency and lowering their cost. The Administration has also cut the photovoltaic budget from $160 million to $60 million, and I think next year it's to go down to $30 million. How did the Administration determine that the photovoltaic industry was both capable and likely to assume that R&D?

MR. CHILES: By talking to them. To give you one idea--as I said before I worked for Westinghouse--when I left Westinghouse, we were working on our photovoltaic line. We had come up with a thing called a dendritic web method for growing the crystals. What this did was--if any of you are familiar with photovoltaics--usually you get this big sausage of silicon and then you slice it into wafers, you lose about half of it in the sawdust--you then polish these things and make your crystals--wafers--out of them. We had developed a process where you drew a long ribbon of silicon directly about an inch wide to make your cells out of--virtually zero scrap, which is tremendous. The thing was ready to go without polishing, and then you sent it through the photographic process and made a photovoltaic out of it. Obviously, rather than being round and being rectangular, the packing density was much better on the grids, the efficiencies were much higher, and they were much cheaper to make.

We are also looking at processes to make silicon more cheaply than the ingots that you buy in the first place. By doing this, the Westinghouse timetable said that by 1987 we'd be making these cells for 50 cents a peak watt.

Now, ask yourself--does the Federal Government have to subsidize a company like Westinghouse who sees a profitable product coming to the market in 1987?

QUESTION: But part of that project was DOE-funded.

MR. CHILES: Sure it was. But I will say this, though, only about 40 percent was DOE funded. The other 60 percent was Westinghouse funds. But you're right. And the way that got started, of course, was back, as I said before in the 1970s when the price of oil was controlled, you had to subsidize things or you never would have gotten this kind of research.

Another example--take OTEC. OTEC was also a project that was funded through Westinghouse by the Federal Government. Just as soon as the Federal Government said, "Okay, Mr. Westinghouse, we're no longer going to give you 100 percent on OTEC; we'd like you to contribute 20 percent." Westinghouse says forget it. It isn't worth it. We didn't say that on photovoltaics because it is worth it. And that's the difference.

QUESTION: Not all the companies that are active in photovoltaics have the resources of Westinghouse.

MR. CHILES: Yes. But on the other hand, there are some that are way ahead of Westinghouse. Solarex and Arco are way ahead of Westinghouse. In fact, Westinghouse has three contracts to build solar houses and they are buying the cells from somebody else.

QUESTION: So you're confident that the level of R&D in the photovoltaics industry will continue at at least the $160 million level?

MR. CHILES: No, I didn't say that. I said I think it will continue at a level that is consistent with the market.

One of the things you've got to ask is, is it the Federal Government's role to allocate where capital resources should go in the whole economy or not? And if we take the arbitrary position in the Department of Energy that the Federal Government knows better than anyone else whether that dollar ought to be spent on solar photovoltaics or on better engines for cars and new factories or ways of making protein from natural gas or what have you, we are making a decision on how this economy will evolve. What we are saying--

QUESTION: Well how about synthetic fuels where you are providing subsidies to Tosco, Union, and Great Plains?

MR. CHILES: Not one dollar of government money is going to go to those.

QUESTION: If you were making decisions--by government action--you are encouraging the movement of capital from public sectors into that particular sector. So you've made some kind of decision that the government should encourage that movement of capital.

MR. CHILES: I understand your point of view. I don't agree with it. But the thing I'm trying to say is what we think, is that the free market ought to decide whether that money should go to the solar cells or should go to something else. And we don't think it's our position in the Department of Energy to arbitrarily make those decisions. Okay? It's a conceptual difference, and I realize we have a different point of view.

QUESTION: What is the Administration's position on supporting energy tax credits. Also what are your most recent thoughts on the DOE reorganization?

MR. CHILES: Okay. The first one on the tax credits, let me separate out the views of other portions of the administration from the views of DOE. The views of DOE are to continue the tax credits. There are other organizations

within the administrative branch that I think are considering other things. And I don't want to go any further. You can read between the lines.

The second thing is what are we going to do with DOE? This is an excellent question. Right now, within DOE, each of the Assistant Secretaries is having their half hour with the Secretary of Energy all this week in which they say, "This is what we think we ought to do with our piece of the action, Mr. Secretary." And at the end of this week the Secretary is going to start deciding exactly what he's going to do with DOE.

From my perspective, being the Secretary's staff, if you will, I'm going to not only tell them what I think ought to be done with the policy office, but what ought to be done with all of DOE. I think what happens is it goes something like this. If you look at DOE's programs and you put each one of them on a 3 x 5 card and you line yourself up a bunch of trash cans around the room and you label them things like Department of Interior, Corps of Engineers, and so on and so forth, there's a bunch of those cards that very neatly flip into the right trash cans. But you're left with a stack that you don't know what to do with. This is the problem, and I don't see that the word of dissolving the Department of Energy is an overworked word. You may not have a Department of Energy after this is all over, but I think functionally you'll have in different places a majority of what we're doing today. You may end up with an "agency of energy" and not have it be at a cabinet level, with all this cadre of programs that you can't put anywhere else. Okay? But I don't think you're going to see an absolute abandonment of the U.S. Government concern with energy.

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I just got back from a trip to Japan, by the way, and this is one of the questions they asked me everywhere I went because they are extremely concerned. In a country like Japan, there is hardly any bigger issue than energy, and they were scared to death that Reagan was just going to say energy is not an issue any more. We're going to abandon even worrying about it. That's definitely not the case.

So I can't tell you how this issue of reorganization/dismantling is going to come out, how it's going to be reconstructed, or if it's going to be reconstructed because there is a body of knowledge that says maybe doing away with DOE isn't such a hot idea. Okay? But we're still in the process of trying to figure that out, and I'm giving you some ideas on how we're going but I can't give you any final answer yet because there isn't any.

QUESTION: Does the White House have any difference of opinion on how the DOE people feel about reorganization?

MR. CHILES: I will defer to Dr. Swanson. But I can tell you OMB differs with us. Yes.

DR. SWANSON: With respect to the question of the tax credit, I think we're in the process now of sampling the needs of various departments, and when all of that is back in, the President will make a decision. DOE, Treasury, OMB, HUD, and the other Departments will be in on the decision process. That process is somewhat complicated and it may take a while to make a decision.

As far as the reorganization is concerned, I think Hunter's explanation was fine. It's a process involving the presentation of general guidelines which the President has done. DOE comes back with an organizational plan for carrying out the President's decision, which is looked at internally to see

whether it will work, and whether all of the pieces get put in the right functional places. Finally, a legislative recommendation is sent to the Hill. It will take a little while on that as well, I think.

QUESTION: What does the President hope to achieve by dismantling DOE? Is it purely a matter of budget statement or is it a matter of policy reorientation?

DR. SWANSON: I don't think you can separate the two. There has been a tremendous effort made lately to try to find ways to reduce budgetary exposure. I think that the degree you do that through the organizational plan at DOE will help. I believe the President feels very strongly that the best way to achieve a fundamental market orientation toward energy policy is through the kind of plan he has presented. The Department of Energy has, I think, some extraordinary capabilities within it. I came from a national laboratory. I know the people who work there. I know the work that is done there, and it's one of the gems this country can offer the world.

On the other hand, I think the regulatory functions the DOE has carried out over the years have been a bit of a problem. There has been a notion, that has been collectively formulated, that somehow the Federal Government can operate on energy markets in a way that the marketplace cannot. I think the collective wisdom over the last 8 years or so is that it just really hasn't worked very well. If one is retaining the Department of Energy just to have a Federal policy control over the way the energy market works, that's not sufficient reason to have the Department of Energy.

QUESTION: Please discuss some of the past legislative concerns and issues associated with the problems at DOE.

DR. SWANSON: It seems to me that a lot of the carping at DOE for the last 4 years was multidimensional. The Congress had a real problem in trying to make the decision and trying to come to a collective judgment as to how one can interact with the energy marketplace. I think the legislation that was written and finalized under the previous Administration was a collection of starts and stops, tremendously complicated and really did not represent a very coherent view, at least a view that people can understand simply as to where this country is headed. And I think that in implementing that kind of a program DOE was caught between a rock and hard place.

There is also another problem which everyone in this room is probably aware of. When you get into a situation where the conferees can't come to an agreement on an issue, the conferees generally agree that they won't say anything. The issue is then passed to the agency and they generally let the regulations reflect what they think they can defend on the regulatory side, and what they think they can defend in the courts. All those cases where legislative clarity was missing from those five laws were dumped in the Department of Energy. The DOE and all of the private sector community had to interact with that, and both were caught between a rock and a hard place. I think a lot of the criticism of the Department was due, in part, to the tremendous problem that the Congress and the executive branch had, in coming to grips with how best to handle this situation.

Now, that's just strictly on the regulatory side. On the other side, you had the research community and the other parts of DOE that were moving ahead with tremendous, absolutely tremendous, work. And personally for me it was kind of frustrating to see this struggling on one side, and this kind

of coherent work that was going on on the other side, and the two of them never really meshed in the public's mind. I think the bad publicity that was directed toward DOE was driven by the regulatory issues the President addressed in his campaign. There was ample evidence of dissatisfaction with the regulatory program around the country, and as a result I think there's a fairly strong interest in trying to reorganize the Department in such a way that one doesn't get caught in that same trap. Rather you preserve the best of what you have collect and organize it, and make it into a real showboat kind of an organization.

MR. CHILES: Let me just add to that. One of my major projects right now is the Title X, the Sunset review of DOE. One thing I am doing, and I'm going to make sure it gets done, is I'm going to use that as a way to showcase the talent that exists in the Department of Energy. And the way I'm going to do that is I'm going to point out very specifically what were the rules that were laid down for DOE to operate and then, given that set of marching orders, how did they do? And I think it's going to look very good as far as how the Department performed given the rules they were given.

Therefore, if you don't like what they ended up, go back and criticize the rules. Don't criticize the Department.

QUESTION: With respect to the cards in cans, do you see basic and applied research functions all on one card and therefore all going together somewhere else?

MR. CHILES: No sir.

QUESTION: Or do you see them being divided up and going to various places? Specifically, where do you see the future of the national labs?

MR. CHILES: Like the whole thing, it's totally open for grabs. You know, in my own Department looking at this thing, I've gone through about 15 different scenarios of things you could do to make it all work out. But I can't really answer that question because I don't know yet how it's going to turn out. I will say this, though, getting back to the original question here. A lot of what's going on--and I guess I shouldn't come up with personal opinions, but I'm going to do it anyway--I think a lot of what was going on about dismantling DOE has to do with the regulatory side of things and has to do with the effect that what would look like an overt action, if you will, might impress Wall Street that the Reagan Administration was really serious about their economic programs.

When you really look at it very caustically, what you find is that you're probably going to end up with maybe a billion dollars less money in general being spent on energy and maybe 2,000 or 2,500 fewer people involved. But I do think you're going to see a large majority of the functions still continued. They may be in different places; they may be under a different name. But we're not going to turn our back on the energy situation. There's no question about that.

QUESTION: I think that one of the questions that's being repeated over and over again here is the question of a disparity between philosophies that the Administration has spoken about and the budgets that came up to Congress. I think a lot of the offices represented here all see the idea of the free market doing the job. And then we see the budgets coming in where the free market is to do the job in some areas--renewables, alcohol fuels, and

conservation. And it looks as though, I mean the appearance is, that the Administration's coming to Congress with decisions based not on a free market philosophy but on favoring one kind of fuel over another or one kind of enterprise. I'm wondering if you could address the apparent disparity between the free market arguments of the Administration and basically the budgets that came up which are clearly weighted more in favor of nuclear versus solar as far as changes in Federal priorities.

MR. CHILES: The problem with the nuclear budget is there are so many things that the Government is going to do that they can't let private enterprise do. They are, if you will, relics from the early days that they said they were going to do them. There's no way to escape it. Waste disposal, enrichment facilities, things of this nature--they just can't get away from. A major portion of the budget is into that area.

As far as the accusation that this Administration is trying to make nuclear the energy source of the future, I simply don't think that's true. I think what we're trying to do, and I'm trying very hard to be a part of that, is to make it a viable option, which it clearly is not right now. For example, if you or I were the president of a utility at our young age looking at the next 15 years, would we want to go through the hassle of all the hearings to buy a nuclear power plant? Heck, no, we wouldn't. So what would we do. We'd say, well gee, not only do we not want to go through that hassle, but if we decide to go coal instead, we even can wait 3 years to make the decision of whether to go or not. So clearly nuclear's just flat not an option today.

What we're trying to do is to get it back where at least the guy can look at the economics and say, okay, the economics favor coal, the economics favor nuclear, whatever it happens to be, and say there are no other things that will damn one technology or the other and therefore I will make my decision on the basis of the economics and not on the basis of the emotions of the issue, the hassles I'll have to go through, and all these other things.

I know that doesn't answer your question totally, but that's part of how we see the nuclear issue. On the synfuels, as I said, remember no money has changed hands on those projects. We have simply guaranteed loans. There has been a history in this country of doing that--for Lockheed, Chrysler, and so forth. I don't know whether your personal philosophy believes in that or not. I would assume not.

But the other part of it--I will go back to what I said earlier--that when the price of oil was fixed you needed subsidies to get some of the industries started because they had to get over that hurdle of a low oil price which was artificial. Now that you do not have that hurdle any more and now that they are competing with an energy source that costs twice as much roughly, we don't think the subsidies there are necessary. And we think private enterprise can do the job and will.

QUESTION: Can you go over a little bit your thinking regarding long-term R&D judgments and how you're doing it? Dr. Rothberg had a list of long-term R&D projects that are being dropped.

DR. SWANSON: I worked a lot on the synfuels issues last year, and I've been working on a lot of nuclear issues over the years. At least in my mind, it breaks out in a slightly different way but with the same conclusion that

Hunter was talking about. If you take a look at the things that serve as impediments to the development of a commercial market for different energy technologies, there's a whole host of things that interfere with what you want to try to do.

Number one, looking at the Federal role in developing good ideas at the national labs or other research that the Federal Government gets involved in directly or indirectly, you have a patent problem. When somebody wants to take something off a Federal shelf and make it into a commercial product, you always have the Federal patent problem--that the patent is not exclusive, but basically can be picked up by almost anybody. In recent years, there's been some improvement in this problem, but it still represents one impediment to a commercialization effort.

Second, I think, is the regulatory influence of the Federal Government and the way that a risk to a private company can be changed by a regulatory action of a Government agency. Changing a discharge limit, for instance, at EPA, changing a land permitting procedure at the Department of Interior, and changing a surface mining regulation are important examples. All of these things are ways in which the risk that a private entity decides to take initially can be affected and changed. What was an acceptable risk at the beginning all of a sudden becomes something which changes all of the decisions that they have made and the project is no longer defensible from their point of view.

I think with the synfuels area and with the nuclear area, you have two tremendous regulatory hurdles that you must cover.

In a lot of cases the risk isn't even known because a lot of the discharge limits haven't been set. On the nuclear side, it's not clear whether NRC can develop an acceptable licensing scheme that pushes the regulatory process to making decisions in a timely manner. With respect to solar technology, you just don't have that kind of a problem. You have a market problem, purely an economics question. Can you develop a particular product and sell it at a particular price? There isn't much in the way of EPA regulation that you run into and there isn't too much of a land availability question.

Now, the third thing I think that is critical to thinking in this area is how much money is it going to take to build a facility? If you're building a plant to produce solar energy, photovoltaic cells, you're talking about several tens or maybe several hundred million dollars, depending on the size of the plant. If you're dealing with a synthetic fuels plant and you're looking at a commercial size facility, you're talking anywhere from $3 to $5 billion dollars.

The question comes--who's going to put up that money and on what basis are they going to be able to put it up? And if other people are putting money into the system--bankers, insurance companies, whoever else has money these days--what do they perceive as being an acceptable risk for the investment that they want to make? What they always do is they end up looking back to the Federal Government and they say: "All right, in what way can you fellows destroy what we perceive right now to be viable economics. If you are in that position, Mr. Federal Government, of being able to do that, are you willing to take some of the risk that's associated with our investment in this area, sharing in the national interest?" The argument the bankers

and the investors always come back with is: the Federal Government has a way of destroying the economics of this project and we think that you should share in the risk in order to have a check and a balance against what you otherwise might do.

And it's a tough call on the Federal Government's part because in a lot of these regulatory decisions the law constrains the way you have to make the decision. Some discharge limits are very, very difficult to get at until you have the data in hand. One of the things that got mixed up in the whole synthetic fuels question is: Can there be a way in which the Federal Government (1) shares in the risk, and (2) disciplines itself internally so that the decisions are made consistent with the risks that the government has in the project, as well as the risk that the private sector has in the project? And the reason I think why you see a synthetic fuels loan guarantee program is because that fundamental conflict--we have never been in a situation like this before. We've got these enormous capital investments that have to be made with enormous influence on the part of the Federal Government as to how they can destroy the economics of that kind of a project.

We're getting into it on the issue of the Alaskan natural gas pipeline. We're into it in the synfuels issue. If we get into any other big energy technologies, it's just a fundamental policy problem that has been addressed as effectively I think as the Congress has been able to do in the synthetic fuels area. In my opinion, we still don't have a good handle on it in the nuclear area. If it ever comes up in the solar area, there's going to be the same kind of a problem. We're just going to have to work that out.

And I think the difference you see in the direction we're going in solar as compared to synfuels is because of the nature and the size of the capital investment and the influence of the regulatory decisions on it.

QUESTION: I'm sorry, but there just seem to be a lot of inconsistencies. First of all, Congress has passed a law last year that for all public-funded research allows the private sector to hold the patent rights, so that would take care of your first problem. But after that, it just seems that you're still making economic decisions and what you're saying is that because the private markets favor decentralized versus centralized, that the government is going to focus their efforts to reducing the risks of the centralized solution. And that is an economic decision that the government's making.

DR. SWANSON: You're making an assumption there that the market favors the decentralized versus the centralized.

QUESTION: You said it takes less capital to get into it, obviously less capital intensive--

DR. SWANSON: But that doesn't mean that the market favors the smaller investment. The market may very well favor the larger investment, except for the fact that there's a component of risk there that has to be dealt with. Economies of scale, for instance, generally move you toward bigger investments.

QUESTION: Yes, but while you're removing that risk you're forcing--

MR. CHILES: I'm not saying that you're removing that risk. What you are doing, I think, is trying to discipline the Federal Government in the application of its decisionmaking in such a way that--

QUESTION: What does "discipline the Federal Government" mean?

DR. SWANSON: I'm not aware of any situation in the past where an agency like EPA, for instance, has had to worry about the impact on the Federal budget of a decision that it makes on a discharge limit or on some other regulation or standard that it would set. The impact has always been on the private side. Generally in the regulatory system you decide to take certain sides because you have to, under law or under whatever discretion you had, and set a standard at a certain level. What's mixed into this decision, into the process right now, is that there is a Federal risk, there is a budgetary exposure, there is an outlay problem that you can get yourself into by setting a standard at a certain level. And in the case of synfuels, there's a discipline within the Federal system right now to look at what you're doing to yourself, not just what you're doing to the other guy.

If, for instance, a discharge limit or some other land decision destroys the economics of a project, you may have to call in a loan guarantee.

QUESTION: Yes, but it seems to me you can destroy the economics of a decentralized project by regulating it as well as a centralized project.

DR. SWANSON: But are there regulations which apply to a decentralized project? And I think the answer is generally--

QUESTION: But there are a lot of skewed building codes across the country which don't specify the end results, but do specify the materials which go into a project which directly impact the technology. And it seems to me it's still sort of--

DR. SWANSON: Those are not Federal building codes. Those are for the most part local.

QUESTION: Okay, fine. The Federal Government can't help in this area. That is a risk. But you say they can handle that. They could be able to

handle 50 States and regulations there. And you're still skirting the issue--these solar technologies, photovoltaics are competing directly with nuclear. But you would subsidize one; you would drive the market there, and you're not going to do the other one.

DR. SWANSON: First of all, we're doing it on the nuclear side primarily because of the Atomic Energy Act problems. There are Federal responsibilities in just making sure that the regulatory agency makes its decision in a timely manner. For instance, if the Nuclear Regulatory Commission says no on a permit, they say no. But if they make that decision in 6 months rather than 3 years, that means a lot.

QUESTION: I don't want to push the nuclear thing forever. But I understand Mr. Stockman has come up with $100 million for Three Mile Island (TMI) cleanup. That's not kind of a regulatory thing. That's basically covering the risk a little bit for the private sector.

DR. SWANSON: Well, in the case of TMI I think that the Federal Government has a responsibility to look at a situation which is rather complicated. Number one, we will have to probably take custody of the high level waste problems that exist at TMI. Second of all, is there a national interest that can be served by the Federal Government contributing an appropriate amount of money to the cleanup at TMI, both in terms of the multistate area in which TMI serves, as well as in the national interest generally? And I think the President has decided that yes, there is a national interest and the amount of money that we put in will be consistent with the degree of national interest that he thinks is there.

And I think that you'll also see that the vast preponderance of the money that is spent in cleaning up TMI will come from the investors and the rate payers on that system, as well as the industry.

QUESTION: I'd like to address myself to the issue of free market forces and hydrocarbon fuels. We all understand that the Government has a duty to care for the national interest, to look after the national interest. With respect to the hydrocarbon fuels, you have an international organization of the markets such that the national interest and the national governmental interest or public interest, and the private interests of international corporations that deal with hydrocarbons are going to clash. How do you propose to handle that? It is an issue that has been with us quite openly for at least 8 years, although it was there before, but it was not important because the prices were so low.

So, we have a conflict here between public interest which the Government is responsible to and the so-called "private corporate" interest in the free enterprise system which diverges from the national interest.

MR. CHILES: Let's even make your question more complicated. What about our obligations to the International Energy Agency (IEA)? I don't know how one even approaches answering that question, to be honest with you. I understand your feelings.

QUESTION: It's difficult to even approach. And it does carry the conflict of interest to what President Reagan has announced as the free market forces to rule our energy supply.

MR. CHILES: Okay, I think I see what you're getting at now. This is a question I was asked at a different hearing. In essence the question was asked a different way. They said: How can you say that the free market works when

OPEC controls the price of oil? That was basically the question I was asked. Is that the kind of thing that you're getting at?

QUESTION: It's OPEC, the private corporations which have international interests as opposed to American national interests, whereas the Government should have only American national interests at hand.

MR. CHILES: You know, I'm still trying to get my arms around a cloud. I don't know where to start on your question. We do have international interests in energy as well, and you can't divorce them. I think what you're getting at--and let me try this one on you--one of the things that somebody brought out to me was that the equivalent price of coal in this country is $23 a barrel equivalent less than the price of oil. Therefore, why are we burning all this oil and not burning all this coal? And it got back to what Dr. Swanson was talking about. The regulatory mire just eats up that $23 very quickly.

Now I'm not sure where you want me to attack this issue. I just came back from Japan where they were interested in why we weren't shipping more coal to Japan and they were complaining about buying coal from Australia that was delivered over there at $49 a ton. I just don't know where to start on your question. I'm sorry.

DR. SWANSON: Let me take a shot at it. It seems to me that the events of recent years, starting in 1973, have made it pretty clear that the public and national interest that is at stake here in the United States with regard to energy supplies is shared directly, and in some cases it's even more of an interest, in Japan, Western Europe, in that those countries are as dependent or more dependent on Middle Eastern supplies or OPEC supplies of oil as we are.

And therefore, it seems to me that one cannot think about our national interests alone--but also, must consider how it is connected with the national interests of the entire free world. All of us are faced with the same problem; all of us have the same dependency; and all of us look at the same risks. The IEA is designed to try and share those risks if all of us collectively get into a problem, or if any one of us gets into a problem.

Now, if you look at the role of the private companies in this system, it seems to me that the private companies have a private interest that feeds off of the public interest. They have to be very careful how they respond in an emergency to ensure that no particular segment of this group of consuming countries becomes sufficiently disturbed at them that they lose a marketing capability in that country, or are faced with some other punitive kind of action which affects their business in that country.

Basically what those companies have to make sure they do is to run their systems in such a way as to provide the maximum amount of fuel and the maximum number of service stations they have in each one of those countries so that they can't be accused of acting in a non-public interest way.

QUESTION: If things were to operate as you suggested, then IEA is operating for no purpose.

DR. SWANSON: I don't think so. I think that what the International Energy Agency does is to provide a supervisory framework to make sure that the companies operate in a way which is consistent with IEA's interests, member countries' interests, and the companies' interests. My personal guess is--if we ever got into a situation where there was a profound shortage of oil, we probably would never have to go to the mandatory allocation of crude. The system would probably end up balancing itself pretty carefully.

But the existence of IEA as a supervisory or regulatory or disciplinary function on top of the operation of the countries, I think, serves as an important public confidence measure. If it ever has to be used, it is there, and it can be used. But, and who knows, it might be that the companies do fall into chaos and for their own self-interest they have to depend on IEA to make a decision, which for them is not economic. And the energy markets might degrade into that kind of a situation. If that's the case, I think we have a system to handle the problem. It's a useful function for a regulatory body, and that's what it's been designed to do and if it ends up doing that, perfect.

QUESTION: Certain tax provisions help oil companies produce oil abroad. At the same time you're talking about cutting energy tax credits for renewable energy sources which are domestic sources. Would there be a reason to diversify our domestic sources by something like an energy tax credit for our domestic sources, and might there not be a conflict of interest in giving oil companies tax credits for taxes paid abroad?

MR. CHILES: Well, first of all, I'd like to point out that it isn't just the oil companies that get the credits. It's every American company that has businesses overseas.

I don't quite know how to answer that question either. What we think is that energy resources ought to compete on their own. In other words, one of the things that we've said as an example was that we didn't figure that it would be a good idea for this country to replace imported oil, which we're getting at $34 a barrel, with some other energy source that costs us the equivalent of $60 a barrel. As an example, with your wind energy, there are

a number of areas where wind energy makes an awful lot of sense--like Hawaii and some places in the Midwest and so forth. But I don't see that as a universal panacea, any more than I see nuclear as a universal panacea or coal plants as a universal panacea. I think everybody within their area has to look at what's the most economic resource for them to use in their area. As an example, in Montana, if I were funding a utility in Montana, there's no way I'd buy a nuclear power plant. Okay?

If I were in Washington, D.C., in the summer, there's no way I'd buy a windmill. Okay? I think you have to look at each area and say what is the most economic source. Another one we talked about was, are we subsidizing nuclear versus solar. Well, I can tell you for a fact, when you look at what solar plants cost, they're about 10 times as expensive as energy produced by electricity right now. Now if you love solar, put one in. But look at the economics, and if you're going to make your decision on economics, fine. If you're not, then don't trash up the argument with that.

QUESTION: But there are other concerns besides economic factors that need to be addressed.

MR. CHILES: Fine, you can address all you want. You can put them in the equation any way you want. What I'm trying to do is remove stone walls, not hurdles.

QUESTION: How do you deal with these other issues? I mean, you just keep going back to what are the economics. Is there any reasonable consideration to be given to diversifying domestic sources over continuing the import of foreign oil, and giving benefits to foreign oil?

MR. CHILES: No, there's not. I think I see the issue you're getting at. There's been a lot of talk about should we put a premium on imports. In other words, if imports are coming in at $34, should you add $10 and say anything that costs $44 or less we should put in. What we're saying is in effect "no" because we haven't been able to calculate that number. But what we are saying very specifically is that you ought to substitute anything that costs as much as or less than imported oil for it, but not anything that costs more. Because the free market says hey, that's a bum decision. You ought to put your capital somewhere else.

QUESTION: On the reorganization of DOE, will you share with us where the defense-related activities might be placed?

MR. CHILES: Sure will. That's one that ends up in my pack of cards, that I can't put anywhere, to be very blunt. Obviously, you can't put it in the Defense Department because all the Dr. Strangeloves there would do weird things with bombs. So it's got to be somewhere independent, okay? And I don't see, personally, any other agency for it. That's why I think you have to end up with a residual something that takes programs like that that are in the Department of Energy right now rather than send them somewhere like Defense.

That's probably the best example of one that you can't do anything with that I can think of.

QUESTION: Is that an argument--are you saying that Cap Weinberger is not a civilian chief at the Defense Department?

MR. CHILES. Historically, no.

QUESTION. Historically, that was done because there was not a Department of Defense at the time. The old AEC was formed before the Department of Defense.

MR. CHILES: The history, as I understand it, is that at the time the decision was made, it was not proper to have the weapons building facilities under the control of the Army, Air Force, what have you, but rather it should be put under some sort of civilian control. At that time they set up the AEC with five commissioners to oversee it. What has happened now, of course, interestingly enough, is that the five commissioners are now on the civilian side and the defense side, which wanted to fire the commissioners in the first place, now has one guy--my boss, the Secretary of Energy.

But the historical precedent, as we see it, is--I just can see the roof coming off the Capitol over there if anybody suggested that weapons manufacture be given back to the Department of Defense.

QUESTION: How about the stockpile? They get a free ride on the warhead cost.

MR. CHILES: That's right. I hear all your arguments. I just think that other one is overriding and so--

QUESTION: No, you're using something that's 35 years old.

MR. CHILES: Fine, fine. Okay. We'll open that issue up, but all I'm saying is that everyone I've talked to just says, my God, don't even think that. But I'll take your point of view back. I've got my meeting with the Secretary this afternoon. I'll say at least I found one soul that doesn't think it should not go back to Defense.

DR. ROTHBERG: Hunter, I had one question I'd like to ask. Let's go back to this issue of the difference in purposes between the national need and the public need. In light of the tremendously long lead time required to bring new energy technologies into the marketplace and in light of the economic

conditions today, will the private sector move forward in the manner you expect? Furthermore, if we do rely upon the free marketplace, there may be conditions sometime in the future where we just don't have the technology base to help us in a long-term energy crisis. If this happens, the potential for economic failure is just enormous. Would you address that question?

MR. CHILES: Yes. I think the potential for failure is enormous no matter which way you do it. I'll tell you, I do have strong feelings about the private sector. The private sector hasn't been given a chance since before the Great Depression to try to do what it can for this country. And I've told many of the people in industry that I've talked to, if you drop this ball, forget it. You're never going to get another chance.

Let's talk about the point of view of how long it takes a technology to get to market. I think most of you can feel familiar with the story of the nuclear industry, which probably had the greatest combined push of Government and industry ever. It took 34 years to move that technology from the laboratory to where it contributed as much energy as does wood. Now what that means to me is that we look at solar, wind power, all the rest of them; before they're going to make a measurable contribution, it's going to take a period of about that long. So, whether we like it or not, those things are going to be 21st century items, and the question that I've always had is how do we get from where we are today to when those technologies <u>can</u> supply the major portion of our energy resources. That's what I want and that's what I want for my kids. What I'm saying is within this transition we're going to have to go with what we've got.

QUESTION: To follow up on Dr. Rothberg's question--if you limit it just to liquid fuels which is really where the energy crisis is, and factor in the national security implications, are we then saying, well, we're going to rely on imported oil or increased domestic production in the 21st century?

MR. CHILES: Yes.

QUESTION: That seems to be where we're headed?

MR. CHILES: What we think is going to happen is that as we move toward the 21st century, oil is going to keep getting more and more expensive until more and more of these other technologies can come in. We think that's the way it's going to go. You're also talking about this question of why do we still import oil, which gets down to an issue of dependence versus vulnerability. When the gentleman was asking the question about the international implications, that was what kept going through my mind. Even if we became "totally" energy independent, we could still be vulnerable to oil supply interruptions. Events or decisions which affect one country nationally, have international implications. For example, if a single country has a 7 percent decrease in its imports due to lack of supply, not lack of demand, all the other countries must help share that decrease. So what that means is that even if the United States were in a position where it had no oil imports and Japan got cut off, we would have to come to their aid. So we still have the vulnerability. So the issue of trying to reduce oil imports at any cost based on removing your vulnerability no longer holds water unless you decide you're just going to renege on your agreements with the IEA.

QUESTION: I'm not saying that we're not going to have security in the Middle East if we don't import oil. It seems to me that an aggressive program to wean ourselves from these imports makes sense, because this is one area where the market is not going to handle them. As far as these decisions, it's just not going to happen.

MR. CHILES: If you look at the stream of imports right now, the market's doing quite a job.

DR. ROTHBERG: At this time, I'd like to thank Mr. Chiles for his very stimulating and interesting conversation and discussion, and we'll take a five minute break and resume with the second part of our program.

## III. IMPACTS OF REAGAN ADMINISTRATION ENERGY POLICIES ON SYNFUELS

DR. ROTHBERG: The Reagan Administration has reshaped National Synfuels Policy around several objectives. The Administration wants to rely more heavily upon private investment to support synfuels projects and less on Federal tax dollars. The executive branch now seeks to promote the expeditious and prudent development of the natural resources needed for synfuels production. And to help facilitate both objectives, the Administration intends to reduce the regulatory and administrative problems that face synfuels projects.

Let me summarize three specific policies that illustrate these objectives. First, the Administration's action to end oil price controls has provided the petroleum industry with additional capital. Some of this capital could be funneled into synfuels projects. Second, the Economic Recovery Tax Act of 1981 provides for accelerated depreciation schedules that would make capital investment in synfuels projects more attractive for most companies. Third, the Administration wants to inventory Federal lands and waters to determine the available quantities of these resources. If these policies work as projected by the Reagan Administration, a business environment is likely to be created that will promote more investment in synfuels projects than is forthcoming today.

However, to date there has not been a substantial amount of new investment capital flowing into additional synfuels projects. In fact, there have been several projects that have collapsed. With few exceptions, it appears that much of the private sector is still waiting for the United States Synthetic Fuels Corporation (SFC) to extend the welcome hand of Uncle Sam before they'll seriously move forward with the big dollars necessary to build a commercial plant.

Consistent with the objective of shifting the financial burden to the private sector, the Reagan Administration wants to terminate DOE support for five coal-based synfuels demonstration projects. The Administration anticipates that the industrial sponsors of these projects will apply to the SFC to replace the lost DOE funding. Instead of financing massively expensive synfuels demonstration projects, DOE will now focus on the funding of long-term, high-risk R&D projects that industry would not be in a position to finance.

These proposals represent a dramatic policy shift. Over the last 15 years the Federal Government and industry have jointly pursued a program designed to lead toward the demonstration of improved synfuels technologies. Now the Federal Government is withdrawing from direct financial involvement in near-term demonstration projects. By pulling the Federal Government out of these projects, the Reagan Administration hopes to save substantial amounts of money. The Administration expects that if all of its requests were implemented, the taxpayers would save at least $2.7 billion in budget authority for construction and another $900 million in future operating expenses. If these projects encounter the typical cost overruns associated with large-scale construction, the savings to the taxpayer could be much greater.

Congress has largely agreed with the Administration's proposals with one major exception. In Public Law 97-35 funding was continued for the design of the SRC-1 project, which was one of the five demonstration projects targeted for termination. However, actual appropriations for continued funding of this project are still under consideration by Congress.

What are some of the implications of terminating Federal involvement in Federal synfuels demonstration projects? To respond to this question, I would suggest, first, that this action could force the large demonstration projects into direct competition for SFC funding with other projects using more

established technologies. As such competition could reduce funding for both types of projects, any diversion of funds for these less proven technologies could decrease the chances of meeting the National Synfuel Production Goals contained in P.L. 96-294.

Second, the removal of DOE funding from the five coal-based synfuel projects could result in a delay or termination of these projects. Since last March, three of the targeted demonstration projects have been terminated and the other two have been delayed and will likely require SFC support to continue.

Third, the DOE synfuels demonstration projects would have expanded our capability to process coals from Eastern States. Without these projects, our near-term ability to use Eastern coal for synfuels production will be reduced. Although there is some private and foreign work being done on the advanced processes, their successful demonstration under DOE's program would have promoted our ability to use a wider variety of coals. However, even successful demonstration does not guarantee that these technologies would be used in the marketplace.

Thus, the Reagan Administration's plan calls for increased reliance upon private industry to finance the innovation of synfuels technologies. Under this plan, industry will also be making many more of the decisions that will influence the demonstration of a technology base for the emerging synfuels industry. Because of the acknowledged importance of having a strong technology base, it seems important that Congress periodically examine the technological progress that industry is making as well as the status of related environmental programs.

This brings me to the final portion of my talk, in which I will consider the impact of Reagan's policies on the total synfuels commercialization effort and specifically upon how industry is progressing.

Under the Reagan Administration, the Federal Government has barely begun to initiate the large-scale production programs created by the 96th Congress. The fast track program envisioned in the Defense Production Act Amendments of 1980, P.L. 96-294, has only resulted in two awards to encourage synfuels commercialization. DOE's loan guarantee authority under the Federal Non-Nuclear Energy R&D Act has fared little better as it has only been used to aid one large-scale synfuels project. In addition, $300 million in financial awards authorized by P.L. 96-304 to help expedite pre-commercialization activities has been rescinded. The Reagan Administration has also dismantled DOE's Office of Resource Applications, which sought to promote synfuels commercialization. At best the large-scale production programs are moving at a snail's pace when compared to the level of action anticipated in P.L. 96-126 and especially in P.L. 96-294. This last measure called for a synfuels production capability of one-half million barrels of oil per day equivalent by 1987 and 2 million barrels per day by 1992. It should be noted, however, that some of the federally-supported pre-commercialization efforts that were eliminated may have had little, if any, effect on the future rate of synfuels production.

There is also much concern in Congress over the slow start and various problems associated with the SFC. The change in Administrations and the installation of a new Chairman and Board of Directors of the SFC has considerably delayed the SFC program.

Despite deregulation of domestic oil production and tax incentives for capital investment through increased depreciation allowances, many companies are still reluctant to risk their own capital to pursue either commercial or demonstration scale synfuels projects. Only a small number of private corporations are moving forward to commercialize synfuels projects with their own

funding. The potential for major delays caused by lawsuits and uncertainties regarding environmental regulations still constitute another deterrent to private development.

In summary, if you consider the concerns that I have outlined today: the slow start of the Defense Production Act Amendments program (also called the "fast track" program); the termination of Federal support for the DOE synfuels demonstraion projects; the delays in getting the SFC program off the ground; the various remaining uncertainties still facing private investors; the long 10- to 15-year lead times involved in planning and constructing a commercial plant; and the limited number of companies that have invested their own cold cash in the synfuel projects, it is easy to see why the prospects for meeting the National Synfuel Production Goals have diminished substantially.

Considering the progress made by the private sector to date, it appears to have become technically impossible to meet the 1987 goal of a half a million barrels per day. Thank you.

DR. ROTHBERG: If there are any specific questions on synfuels we can entertain them now. Dave, did you want to say anything?

DR. SWANSON: I guess the only thing I'd point out in defense of what the President decided is that I think the vast bulk of the Government work that was being done in the synfuels area was sort of cosmetic or diversionary or not to the point. And I think what we tried to do was say, all right, if we can't engage in things which are a luxury, like for instance public relations, movies, and brochures and other things, which try to encourage people to get into synfuels, it's dubious whether or not feasibility studies and grants and all those kinds of things are really very productive. You're dealing with an industry which is going to require enormous amounts of capital and assets

in order to get started in the first place. And encouraging a lot of little guys to get started may not be the most productive way to go.

I think the President wanted to get to the heart of the problem, and the heart of the problem which is how do you overcome this problem between regulatory risk, financial uncertainty, and technical capability. If you can draw those people responsible for these three areas into a room at the same time and say, look, you better get your act together on this one and figure out a way that you can present a proposal to us in terms of what you think a proper Federal role should be, we'll negotiate with you and try to come up with a deal. A financial package that's available to try to tie that together has been available under the Non-Nuclear Act, the Defense Production Act, and now it's available under the Synthetic Fuels Corporation itself.

That's where we think the real problem exists. We're going into that one with eyes wide open and with an understanding that we're not going to try to set up a permanently parasitic private dependence on the Federal Government to develop and produce synthetic fuels. But if there's a way that we can convince people that it's possible to get into that business and survive the regulatory hassles, that's worthwhile for us to try to do.

## IV. IMPACTS OF REAGAN ADMINISTRATION ENERGY POLICIES ON RENEWABLE ENERGY TECHNOLOGIES

DR. ROTHBERG: Our next speaker is Migdon Segal who will speak on impacts of the Administration's policy on solar energy and other renewable sources of fuel.

MR. SEGAL: Thank you. I did want to mention before I start that my talk may be skewed somewhat toward alcohol fuels because that's been my area of expertise for a number of years, so when I'm looking for an example I tend to look in that direction. It doesn't necessarily mean that that's the most important of the issues with respect to renewable energy.

With respect to solar energy and the other renewable energy technologies, the philosophy of the Reagan Administration is obviously different from that of its predecessor, as you've heard from our two guest speakers this morning.

Under the Carter Administration, the Federal renewable energy budgets had grown steadily, with direct procurements, tax credits, and other programs oriented toward commercialization dominating the Federal effort. Under the Reagan Administration, the role of the Federal Government in the development and commercialization of these technologies is being sharply reduced. Near-term development, and commercialization of renewable energy technologies, will be left to the private sector.

Some incentives for private activities, such as the alcohol fuels tax exemption and the solar tax credit, may remain. But the overall picture is one in which these technologies will have to make it on their own without substantial Government aid.

In keeping with this philosophy, the initial Reagan budget cuts for renewable energy technologies, such as solar energy and alcohol fuels, were quite severe. With regard to solar energy, the Reagan Administration's budget submittal to Congress included a $98 million rescission in the fiscal 1981 solar budget, which reduced spending from $598 million to $500 million, and a $383 million cut in the budget proposed by the Carter Administration for fiscal 1982 for solar energy, bringing the spending total in that area down from $576 million to $193 million, for a proposed 66 percent cut.

The Reagan budget proposed for solar energy would have reduced or eliminated near-term solar commercialization projects, leaving future efforts to focus on long-range R&D projects. In addition, the proposed cuts would have totally eliminated the Solar Energy and Energy Conservation Bank, the large-scale wind system development program, and the entire Ocean Thermal Energy Conservation, or OTEC, program. As to alcohol fuels, the alcohol fuels loan program under which the Federal Government would provide loan guarantees for over $1.2 billion in funding was to be cancelled and all funding for it rescinded.

These, as I said, were the initial Reagan budget cuts. The second round of cuts, which is now coming to light, returned to the original Administration figure of $193 million for the solar energy budget, as opposed to the $303 or $304 million in the reconciliation bill and in the appropriations bill as it cleared the House.

Further cuts are proposed for the next fiscal year, 1983. The revised budget for that year is given as $166 million in "Case One," $79 million in "Case Two," and a "shut-down" case, presumably meaning zero funding.

While the Administration can propose budget cuts, it is up to the Congress to make the final decision on these proposals. And ultimately the response

of the private sector will be critical in determining the future of these programs. The rest of this talk will discuss congressional and private sector reactions thus far to the Reagan budget cuts in renewable energy programs.

As to Congress, this may be remembered some day as "The Year of the Budget." The Congress so far has had three major opportunities to respond to the Reagan economic program--in the budget rescissions for 1981, in the Budget Reconciliation Act dealing with the FY 82 budget which passed this summer, and in the appropriations bills. The new round of budget cuts just proposed may afford a fourth opportunity, depending upon how the Congress chooses to deal with them.

With regard to renewable energy, the biggest battle regarding rescisions in the FY 81 budget concerned alcohol fuels. The Administration proposed rescinding the entire $1.245 billion for alcohol fuels loan programs which had been appropriated under the authority given by the Energy Security Act and other pre-1981 legislation. This was all of the alcohol fuels loan funding except for an earlier $342 million awarded by the Department of Agriculture under its FMHA program.

The Congress rescinded $724.5 million of this funding and retained $520.5 million, or 42 percent of the original. The controversy does not end here, however. The alcohol fuels funding allocated to the Department of Energy was used as backing for loan guarantees for 11 alcohol fuels projects. But the $250 million allocated to the Department of Agriculture to guarantee small-scale projects has not been obligated and Administration officials have stated that they do not intend to use it. The question has been raised as to whether the Budget Impoundment and Control Act makes this spending mandatory since the Congress did not agree to rescind it.

In solar energy in that first round, the Administration proposed rescinding $98 million in FY 1981 funds. The Congress did rescind $47 million, but chose instead to defer the other $49 million for use in future years.

In the Omnibus Budget Reconciliation Act of 1981, enacted in August of this year, the figure reached for the solar energy budget for fiscal year 1982 was $303 million. This was $273 million below the Carter Administration proposal, but $110 million above the Reagan Administration proposal. In its consideration of the Reconciliation Act, the Congress restored some key near-term development programs which the administration had wished to terminate, including the large-scale wind turbine program and the OTEC program. It also substantially increased the authorized level of spending for DOE's solar photovoltaic program.

The Solar Energy and Energy Conservation Bank, which the Reagan Administration had wished to terminate, was left still in existence by the Reconciliation Act. The funding for the Bank was authorized at $50 million, which would be enough to allow this new agency to start operation in FY 82.

The appropriation bills are still making their way through the congressional process. Three of these bills are relevant to this presentation.

The Energy and Water Development Appropriations Bill passed the House of Representatives with a funding level of $304 million for DOE solar programs for fiscal year 1982, which includes $10 million for alcohol fuels. This is nearly the same amount as that approved in the Reconciliation Act. Senate action is pending on this measure.

The HUD-Independent Agencies Appropriation Bill, in the version that was approved by the conference committee, included $25 million for the Solar Bank, which would be a minimal level of funding. The House has agreed to that conference report, but further action has been delayed in the Senate pending the second round of Reagan Administration budget cuts.

The Agriculture Appropriations Bill as it passed the House included $250 million in additional funding for alcohol fuels loan guarantees. Senate action on this bill is still pending.

As to the new budget cuts proposed in September, it's still early to judge congressional reactions. It seems likely however that there will be considerable opposition to cuts which go beyond those already agreed to by the Congress in the Reconciliation Act and subsequent appropriation bills.

Thus, the Congress in its actions to date has been willing to approve the concept of a tighter budget as proposed by the Reagan Administration but has not been willing to approve the magnitude of these cuts. Congress appears willing to exercise its own independent judgment as to just how much should be cut from each program and that judgment often differs from that of the Administration.

What are the implications of these actions for the future of these programs? The Government programs which in the Carter years were supposed to ensure the emergence of viable renewable fuels industries have been severely cut back by the Reagan Administration. What will actually happen to solar energy, alcohol fuels, and the other renewable energy technologies remains to be seen. Industry spokesmen have disagreed on the outlook. In the case of solar energy, for example, the optimistic industry view is that the industry is now strong enough to solve the remaining technological and fiscal hurdles without strong Government support. The pessimistic view is that these ambitious goals for solar energy enunciated in the Carter Administration cannot be reached without Federal support. One of the important industry concerns deals with foreign competition. Some industry spokesmen warn that competitors in France, West Germany, and Japan could overtake the present American lead if the budget cutbacks are allowed to occur.

Similarly with respect to alcohol fuels, optimists contend that the industry can now go forward with the 4 cent Federal highway tax exemption still in effect as a remaining market incentive and with the 11 plants to be built with Government loan guarantees acting as test facilities. Pessimists believe that the withdrawal of the kind of Government support envisioned in the Carter program will be crippling to an infant industry forced to compete with the giants of the oil industry for its share of the automotive fuels market.

Furthermore, there are now reasons to believe that the two remaining underpinnings of the alcohol fuels program may be withdrawn. The highway tax exemption is rumored to be among the new round of tax advantages slated for repeal. And the 11 loan guarantees may be hampered by the sharp cuts in personnel within DOE's Office of Alcohol Fuels. One of the newsletters in that area said that there were now going to be only two professionals left in that office to handle projects and do whatever work is remaining for that office. Thus, the outcome for alcohol, as for solar, remains very much in doubt as of now.

In conclusion, the renewable fuels industries have been staggered by the new administration policy of withdrawing much of the governmental foundation from their programs. Questions that remain to be answered are whether the Congress will insist on retaining a Federal role in development of these industries larger than that envisioned by the Reagan Administration, and whether the industries now begun, such as solar and alcohol fuels, can now survive on their own in a climate radically changed from that of a year ago.

QUESTION: With regard to alcohol fuels, there was some $20 million put out in June of 1980 or July of 1980, some 44 projects under the Alternative Fuels Act were feasibility studies. What's happening in terms of evaluation

of feasibilities on these? Are we ever going to get the numbers or are they going to come out bound in volumes?

MR. SEGAL: I remember that funding, and I haven't heard a thing about it for months. I'm honestly not aware of what happened to that. I would gather not very much has, or I would be aware.

Our next speaker, Dr. Bob Civiak, will discuss the nuclear program.

V. IMPACTS OF REAGAN ADMINISTRATION ENERGY POLICIES ON NUCLEAR ENERGY

DR. CIVIAK: It's impossible to cover all of nuclear policy in just 10 minutes. I'll just introduce some issues and we can explore them further in the question and answer period.

The Reagan Administration has been quite supportive of nuclear energy in its public statements. In the National Energy Policy Plan the President said that "nuclear power has proved to be a safe, economical, and environmentally acceptable energy source." That's quite a contrast from President Carter's position that nuclear power was the energy source of last resort.

Several questioners today have compared funding cuts in other energy areas with the situation in nuclear energy, implying that nuclear energy was being favored quite a bit in its funding. I'm not really sure if that's all that true. Eighty percent of the funding in nuclear energy is for breeder reactors and waste disposal, and it's true that funding is continuing at a pretty hefty pace in those areas. But there are several other programs in nuclear energy in which there have been cuts. The nuclear industry, which was quite jubilant when President Reagan was elected, isn't quite as happy with him now.

The nuclear industry didn't get what they wanted for reactor storage of spent fuel, there have been cutbacks in gas reactor development and the uranium utilization program, and there were severe cuts in the Export/Import Bank which could hurt nuclear exports. In addition, the nuclear industry and the Administration don't agree at all on who should build reprocessing plants.

It really seems like the major support from the Reagan Administration for nuclear energy has been in its positive rhetoric and really--I don't want to

minimize that--that is something that is very necessary for nuclear energy at this point after so many years of looking on nuclear energy as the last resort. To say that it's economical and environmentally acceptable after a few years may have quite a large effect on the industry. The other positive element has been support for the Clinch River Breeder Reactor.

What are some of the details of the Administration's nuclear energy policy and how has Congress responded? The first element in the program is to revitalize the nuclear industry. I've listed four ways they plan to do that in the handout sheet (see Appendix I). The major thrust for doing this is through the President's Program for Economic Recovery, which is designed to stimulate capital investment. Congress has approved most of that economic recovery program; we'll have to wait and see what happens.

The Reagan Administration also wants to speed up the licensing of nuclear power plants. One reason for the decline in nuclear power is an increase from 8 years to 14 years in the time that it takes to get a nuclear plant licensed. It's not really clear how much of that increase is due to licensing, but, in any event, the current Administration has targeted streamlining licensing as a way to improve the health of the nuclear industry. The Nuclear Regulatory Commission, with two Reagan appointees, has passed several measures in the past few months to streamline licensing. Congress has also basically been supportive of this idea. The NRC (Nuclear Regulatory Commission) authorization bills that have been reported in both houses, but haven't yet been acted upon, contain provisions to give the Nuclear Regulatory Commission interim authority to grant licenses to operate nuclear power plants before the completion of public hearings on those operating licenses.

This is basically seen as an interim measure needed because of delays in licensing that came about while the Nuclear Regulatory Commission was responding

to the Three Mile Island accident. The NRC spent all its time trying to make sure that operating plants were safe, and really didn't do anything in terms of licensing new plants for about 2 years.

Will the Administration's programs to revitalize the nuclear industry be successful? In the short term, the licensing speedup is going to help the industry quite a bit. There are 33 plants that are scheduled to come online in the next 2 years, and quite a few of them were going to face long delays from the time they were completed until the time they received their licenses. Those delays were going to cost as much as $2 billion to those utilities, and eventually to the public, in buying replacement power, while those completed plants lay idle. So steps that the NRC has already taken--and it looks like the Congress will approve the interim licensing provisions--will substantially reduce those delays and save the industry and consumers about $1 to $2 billion.

The long-term outlook for revitalizing the health of the nuclear industry isn't so clear. There haven't been any orders for new nuclear power plants since 1978, and the financial condition of utilities is dreadful. Nuclear energy is seen as basically just too risky for most utility presidents to invest their money in it. No matter how supportive the Reagan Administration is, it's going to take at least 10 years to build a nuclear power plant, and the Reagan Administration is going to be long gone before that plant starts to operate. And so most analysts believe that it's going to take at least another 5 years before we have substantial numbers of nuclear power plant orders, and we may not see any nuclear power plant orders for another 5 years.

It's interesting to note that the tax incentives that have been recently passed to spur capital investment may not help the utilities that much, because utilities are heavily regulated by State public utility commissions. The public utility commissions know that utilities are getting a tax break and

they're going to take that into consideration when they set their rates. So the return on investment for utilities, and their financial health, is really in the hands of the state utility commissionss and mostly beyond the control of the Administration.

The next major item in the Reagan Administration nuclear policy is support for the Clinch River Breeder Reactor. You probably all know that Congress funded Clinch River despite Carter Administration attempts to kill the project. However, licensing was halted in 1977 and there has been no construction since on the site. The Reagan Administration supports Clinch River; they asked for $254 million for fiscal year 1982, and, in the reconciliation bill, Congress provided $230 million. So it looks like Clinch River is going to be funded for this year.

"Will it be built?" and, "When will it operate?" are different questions. They're not very easy to answer. Opposition in Congress to Clinch River is still quite strong. This year, in the House Science and Technology Committee, there was a key vote against Clinch River. In the past, this committee has been a strong supporter of breeder reactors. Also, the economics of breeder reactors are less favorable now than when the project was started. So, it looks like Congress may yet decide to kill Clinch River next year or the year after or the year after that. It's by no means home free.

If funding is continued, it may still be held up because of licensing problems. As things stand now the NRC has to license the plant before construction can begin on the site. That could take anywhere from 1 to 3 years. The Reagan Administration may try to bypass the NRC licensing through legislation. Whether they'll be successful in that or not is hard to say.

In any event, what I can say for sure to anyone who's tired of the fight over Clinch River, is that relief is not in sight. It looks like Clinch River is going to remain a contentious issue for the next few years.

The next thing I want to talk about is reprocessing. Last week President Reagan announced that he was formally lifting the ban on commercial reprocessing that's been in effect since 1977. That really wasn't much of a surprise; the Administration, since last March, has been working very hard to encourage commercial reprocessing. There are no plants right now that can reprocess commercial reactor fuel. However, there is a nearly completed plant at Barnwell, South Carolina. The owners of that plant have refused to complete the plant for financial reasons, and they want to sell it to the Government. The Administration has said that it doesn't want to buy Barnwell and it's trying to induce other interests to buy the plant.

Thus far, the Reagan Administration hasn't been successful. I was surprised to hear Hunter Chiles say that Bechtel has announced that they may buy Barnwell in the next few months. It really is quite a surprise because so far private interests have been very reluctant to complete that plant. There have been three commercial endeavors to reprocess in the past and they've all lost their shirts. The economics of reprocessing doesn't look any better now than it has in the past few years.

The Administration is trying to encourage commercial reprocessing. What steps they're going to take to do that aren't yet clear. Someone asked Mr. Chiles about the Government guaranteeing purchases of plutonium, and he indicated the Administration hasn't said that they'll guarantee purchase. However, the nuclear energy policy statement that was released last week contained the words "by encouraging private firms to supply fuel for the breeder program at a cost that does not exceed that of government-produced plutonium, we may be able to provide a stable market for private sector reprocessing."

Now, they didn't say that they're going to guarantee to buy the plutonium, but that may be the direction that the Administration is heading. Congress

may have something to say about Government purchase of plutonium from commercial reprocessors. If Congress thinks the Administration is going to use the plutonium in Clinch River, and Congress supports breeder reactors, then such an initiative may be successful. But if Congress thinks that the Administration wants to use the plutonium from commercial reprocessing for weapons purposes--and there have been some rumblings in the past month or two that the Administration is considering that--then I think the Administration will have a hard time getting the plutonium purchases approved through Congress.

So reprocessing is still up in the air. I think the Administration is still determining its policy on reprocessing. I don't think it's totally decided yet.

The last issue I want to mention is nuclear fusion. The 96th Congress passed the Magnetic Fusion Energy Engineering Act of 1980. That Act set ambitious goals for fusion development, including the operation of a Fusion Engineering Device (FED) by 1990, and commercialization of fusion or a commercial demonstration of fusion by the year 2000. The 1980 Fusion Act also called for a 25 percent increase in funding for fusion for 1982 and fiscal year 1983, although it didn't actually authorize funds for fusion.

The Reagan Administration requested an increase for fusion in fiscal 1982, but it was way short of the 25 percent increase called for in the Fusion Act. The Administration also tried to cancel two fusion projects that had been previously authorized by Congress. In addition, the Administration has yet to commit to building the Fusion Engineering Device, which was explicitly called for in the Act.

Congress later restored funding for the two projects that the Administration wanted to kill and added a little bit of money to fusion funding. In any event, it looks like fusion, which has been held up as the paradigm of long-term,

high-risk research, really hasn't received overly generous funding from the Administration either.

What is the outlook for fusion? Well, the Administration may still commit to building the Fusion Engineering Device in 1983. If it does, then there's some hope of meeting the schedules called for in the Magnetic Fusion Engineering Energy Act. But, if the Administration doesn't commit to the FED next year, then there's no hope of a commercial demonstration of fusion before 2000.

That's it. Questions?

QUESTION: You've heard the Administration lay out its logic and its approach to energy policy that they've used to justify cuts in solar, conservation, and fossil fuels. Do you feel that the Administration is being as consistent in applying those principles to the nuclear area?

DR. CIVIAK: Yes, I think so because the bulk of the funding in nuclear energy really is in breeder reactors and in waste disposal. I think that those are two unique programs that are very high risk. There's just no way that private industry is going to take on the issue of waste disposal. We have this huge investment in the country in nuclear energy and without developing a waste disposal program that's just going to go down the tubes.

I see those as unique programs. Breeder reactors, maybe it's not so clear. But it's clear that it's a long-term program and high risk program that won't be funded any other way. So in that sense, breeder reactors certainly go along with what the Administration's saying--that they're only going to fund things that the commercial sector won't. I really can't comment on whether that is true of all the solar and renewable programs that are getting cut . . . that is, whether they'll be taken over by the commercial sector or not.

QUESTION: What about the other 20 percent of the nuclear budget that doesn't go for breeders and nuclear waste, but nuclear safety R&D?

DR. CIVIAK: Nuclear safety is a small part, and some nuclear programs are being cut back.

QUESTION: Should the Government be involved in doing that or should that be up to Westinghouse and GE?

DR. CIVIAK: I think that substantially they are up to Westinghouse and GE, and I think the industries are spending much larger amounts of funds on those kinds of activities than the Government is spending. It really is small numbers, relatively small amounts of Federal funding.

QUESTION: Is the NRC starting up the GESMO proceedings immediately, and if they are, how long will it take? Or what is the implication?

DR. CIVIAK: They haven't started the GESMO proceedings. In the past 2 weeks they've just started setting up a group to look at licensing of Clinch River. They are really just getting started on it. I don't think--well I'm pretty sure--they're not now pointing toward finishing GESMO, which was a generic all breeder reactors hearings. They're just going to move directly toward licensing the Clinch River plant.

QUESTION: Well how about the reprocessing? I was thinking in terms of reprocessing policy. What will not restarting GESMO mean for reprocessing?

DR. CIVIAK: Until someone actually has a plan for doing something with Barnwell, I don't think the NRC is going to do anything about reprocessing. If a purchaser of Barnwell comes along and looks like he's going to submit a license application, then the NRC will probably start working on it, but until then they're not doing anything that I know of.

QUESTION: Do you think the Administration's plans to use plutonium from commercial reactors to make weapons will adversely affect the overall Reagan program in support of nuclear power?

DR. CIVIAK: As I said, there have been rumblings that the Administration may want to reprocess spent fuel from commercial reactors to recover plutonium for weapons purposes. There's been a tremendous amount of opposition to this suggestion in Congress already. I don't believe that this would help utilities very much because there's so much plutonium out there in commercial fuel that only 5 or 10 percent of it would supply all the weapons needs that we could possibly have. So it really wouldn't have a large financial impact on the industry and it wouldn't help the waste disposal problem very much because it would affect only a small part of the total amount of spent fuel. This use of civilian plutonium for weapons would lead many nations to question the United States' nonproliferation policy and may cause more trouble than it's worth.

The Administration may have just been putting up trial balloons. They seem to be backing away from the idea of using commercial spent fuel for weapons at this point. They stated clearly in the nuclear policy statement released last week that they are only talking about bringing commercial plutonium for use in the Clinch River Breeder Reactor at this time.

QUESTION: Did I hear you say that the plutonium from commercial activities could provide 10 to 20 times what is necessary for an expanded program?

DR. CIVIAK: Something like that, yes. It's way beyond what would be needed.

QUESTION: Is that plutonium-239 you're talking about?

DR. CIVIAK: Yes. It may not be 20 times what is needed; it may be 10. But it's way beyond the weapons needs, unless possibly if the Government decides to shut down all of its own production reactors.

QUESTION: That raises two questions. At the risk of asking classified information, number one, what will the weapons grade plutonium requirements be for

the expanded defense program? Number two, what amount of weapons plutonium do you get with spent fuel?

DR. CIVIAK: I can answer the second part. There are about 70 tons of plutonium contained in the spent fuel that is now sitting at reactor sites. In addition, each 1,000 megawatt reactor discharges about 30 tons of spent fuel per year and about 1 percent of that is plutonium. We have the equivalent of about 50 1,000 megawatt reactors operating, so commercial reactors produce about 30 times 0.01 times 50 . . . or about 15 tons of plutonium per year.

In terms of what the needs are, I'm not privy to that information. That is classified. But in orders of magnitude, I'm quite sure that it's much less than the plutonium that's in the spent fuel that's sitting at reactor sites now.

QUESTION: I'll ask a followup question. I'm still a little confused about that. If one doesn't know what the defense requirements are for weapons use of plutonium, how can you reach the conclusion that what is available is 10 times what you would need for weapons?

DR. CIVIAK: Well, I tried to keep the numbers loose, whether what's available is 10 times or 20 times weapons needs, I don't know. I haven't seen in terms of hard numbers what they need. But one ton of plutonium is enough for about 200 bombs, hence, 70 tons is enough to make 14,000 bombs. Given that plutonium from obsolete bombs can be recycled and reused and that there are three plutonium production reactors in operation, I don't believe that the additional needs of the current buildup is anywhere near 70 tons of plutonium and it is probably less than one tenth of that.

MR. SEGAL: At this point, I'd like to offer some closing remarks. It's clear that we're in a new era with respect to the Government's role in the research, demonstration, and commercialization of new energy technologies. Compared to previous Administrations, the prognosis in terms of Federal support is certainly upbeat for nuclear energy, downbeat for renewables, and wavering for synfuels.

While Congress and the private sector will have their inputs, this broad picture is unlikely to change under current energy supply conditions while this Administration is in office. Our national energy policy is continually being changed. Hopefully these changes represent improvements. All of us on the panel believe that the issues discussed here today include questions which the Congress will have to consider very seriously in the coming months and years.

I would like to thank our distinguished guests from the White House and the Department of Energy for taking part in this morning's presentation. I'm sure we all feel more enlightened now as to what the new Administration's policy really is, due to their efforts and our discussion. We also would like to thank the Subcommittees on Energy Development and Applications and on Energy Research and Production of the House Committee on Science and Technology for joining with us as cosponsors.

Finally, thank you all for coming.